Trend Study 2-35-01

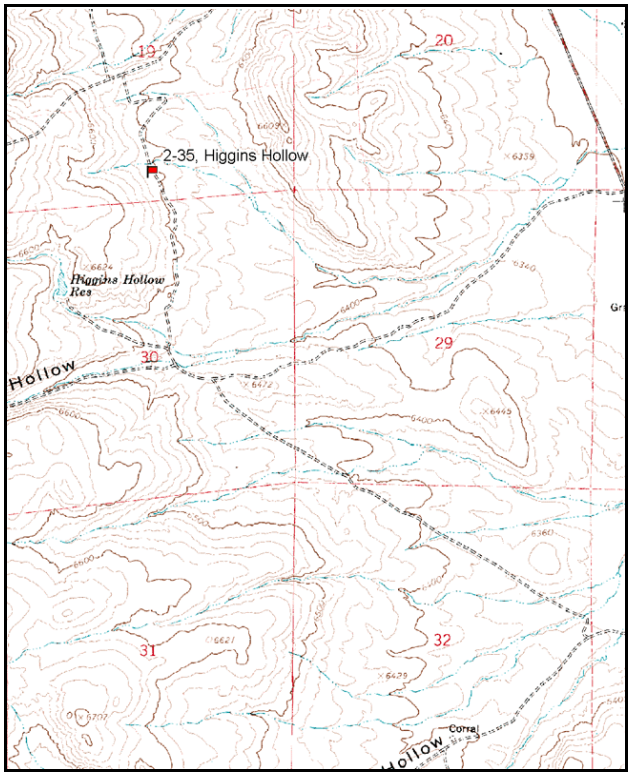
Study site name: Higgins Hollow . Vegetation type: Big Sagebrush .

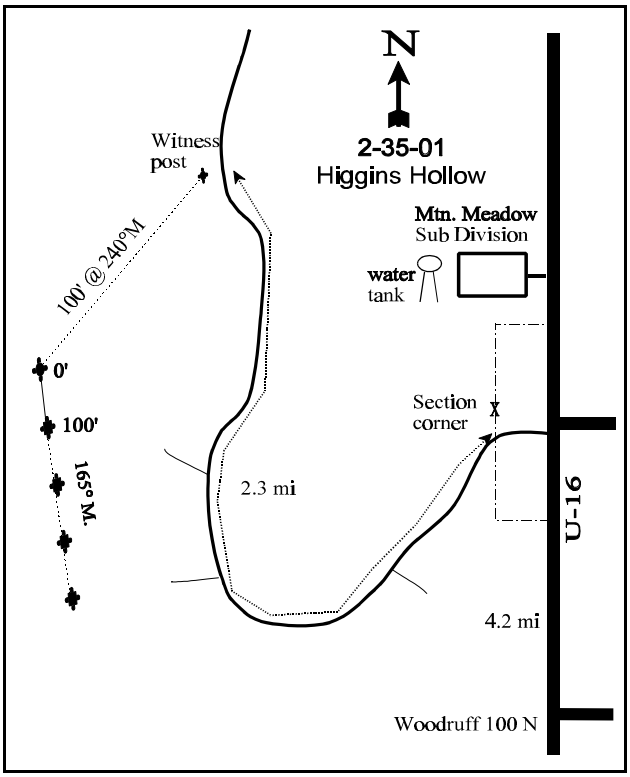
Compass bearing: frequency baseline 165 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From 1st North in Woodruff proceed north on U-16 for 4.2 miles, and turn west to a dirt road. Proceed through pasture passing section marker at west gate. Travel a total of 2.3 miles (staying right) to a witness post on west side of road. From the witness post walk 100 feet at 240 degrees magnetic to the 0-foot stake of the baseline.





Map Name: Woodruff

Diagrammatic Sketch

Township 10N , Range 7E , Section 19

UTM 4603446 N, 483519 E

DISCUSSION

Trend Study No. 2-35

The Higgins Hollow trend study is similar physically and edaphically to the Otter Creek study (2-34). Slope is east-facing and averages 15% to 20%. Elevation (6,520 feet) is slightly higher but the study area is on the same soil type. Apart from location, the principal difference between these two areas is management practices of the past. This study samples a relatively "undisturbed" Wyoming big sagebrush type. Thus, it provides a good comparison to the Otter Creek study (2-34), an area that was mechanically treated and seeded. Wildlife use of the Higgin's Hollow study area appears light to moderate. Pellet group transect data collected along the study site baseline in 2001 estimated 7 deer/pronghorn days use/acre (17 days use/ha). Deer and pronghorn pellet groups were combined due to their similarity in appearance. Cattle graze the area and were present during the 1996 reading. In 2001, livestock use was estimated at 12 cow days use/acre (29 cdu/ha).

The "Pancheri Silt Loam" that prevails on this site is the same soil type as that described for study 2-34. It is a moderately deep, fertile soil with few growth limiting factors (Campbell and Lacey 1982). Soil at the site is deep and mostly rock free. It has a clay loam texture and a neutral soil reaction (pH of 7.1). The study site has an irregular ground cover composed primarily of perennial grasses, shrub crowns, and accumulated litter. There is a considerable amount of roots in the top 6 inches of the soil, due mostly to Sandberg bluegrass. Shrub interspaces tend to be bare and remain that way due to animal trailing and trampling. Some erosion is apparent but not serious. An erosion condition class conducted in 2001 showed soils to be stable.

The key browse species is Wyoming big sagebrush. It accounted for over 90% of the shrub cover in 1996 and 2001. It is by far the most abundant, visible, and palatable shrub on the study area. Stickyleaf low rabbitbrush occurs in fairly high numbers, although it is much smaller and seldom utilized. Although this species often acts as an increaser, it shows no such tendency on this site. Wyoming big sagebrush density was relatively stable from 1984-1996 at around 7,000 plants/acre, and young plants were abundant over this same period. The number of young plants in the population declined to only 160 plants/acre in 2001. However, sagebrush density did increase in 2001 as some of the young sampled in 1996 have reached maturity. Percent decadence has been high at over 40% in all sampling years, except in 1996, when decadency was estimated at 19%. Overall use has been at a moderate level, with heavier use occurring in 1984 and 1990. In 2001, sagebrush leader growth averaged less than 1 inch, even though seed production was abundant. Some plants were dropping leaves in 2001 due to several consecutive years of relatively dry conditions.

The herbaceous component at Higgin's Hollow is dominated by Sandberg bluegrass, a low-growing species. This species provided more than 90% of the grass cover and over three-fourth's of the total herbaceous cover in 1996 and 2001. Several other perennials are present but in more limited numbers. These species include western wheatgrass, bluebunch wheatgrass, and bottlebrush squirreltail. Forbs occur only rarely and are primarily low growing species with little forage value. Hood's phlox and longleaf phlox are the most common species.

1984 APPARENT TREND ASSESSMENT

This site is characterized by a fertile soil that is lightly eroded. It supports a dense and vigorous Wyoming big sagebrush community associated with a rather poor understory. Cattle grazing tends to impact grasses greatly and is allowing vigorous Wyoming big sagebrush reproduction to occur. Grazing is also resulting in some trampling damage detrimental to watershed values. However, overall trend appears stable but could easily change, especially if some disturbance were to occur. One only has to look at roadsides where increaser plants and weeds prevail to see the possibilities.

1990 TREND ASSESSMENT

The Higgins Hollow winter range continues to support a dense stand of Wyoming big sagebrush. At about 20% canopy cover, the sagebrush community appears about at its maxim. There is a high percentage of seedling and young plants. The sagebrush tends to be moderately hedged, as opposed to the more heavily hedged classification of mature plants in 1984. The frequency of bluebunch wheatgrass has declined dramatically, even if the increase in western wheatgrass is interpreted as a misidentification. However, the most abundant grass, Sandberg bluegrass, increased significantly. A fair percentage of litter cover remains, although the changes in ground cover percentages have resulted in increased soil movement and plant pedestalling.

TREND ASSESSMENT
soil - down slightly (2)
browse - stable (3)
herbaceous understory - up slightly (4)

1996 TREND ASSESSMENT

The soil trend appears stable, yet percent litter cover has declined by 30%. Percent bare ground has remained similar to 1990 estimates. The browse trend has improved slightly since 1990. Heavy use has declined and percent decadence decreased from 45% to 19%. Sagebrush density appears to be at its limit, but canopy cover may increase slightly in the future. Trend for the herbaceous understory is down slightly even though nested frequency for Sandberg bluegrass increased. Sum of nested frequency for the more preferred forage species, western wheatgrass and bluebunch wheatgrass, declined significantly as did bottlebrush squirreltail. Sum of nested frequency for all perennial grasses combined declined by 26%. Sum of nested frequency for perennial forbs declined slightly.

TREND ASSESSMENT
soil - stable (3)
browse - up slightly (4)
herbaceous understory - down slightly (2)

2001 TREND ASSESSMENT

Soil trend is slightly up. Bare ground decreased and vegetation and litter cover both increased. Trend for browse is stable. Wyoming big sagebrush density increased in 2001, but young plants are few with percent decadency increasing from 19% to 48%. Utilization is light to moderate, and vigor is normal on most plants. The herbaceous understory has a slightly upward trend. Sum of nested frequency for perennial grasses increased by 15%. Western wheatgrass significantly increased in nested frequency, while bluebunch wheatgrass and squirreltail also increased, but not significantly.

TREND ASSESSMENT
soil - slightly up (4)
browse - stable (3)
herbaceous understory - slightly up (4)

HERBACEOUS TRENDS --
Herd unit 02 , Study no: 35

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'84	'90	'96	'01	'84	'90	'96	'01	'96	'01
G	Agropyron smithii	$_{a}$-	$_{c}$105	$_{b}$14	$_{c}$84	-	49	5	40	.07	.62
G	Agropyron spicatum	$_{b}$217	$_{a}$14	$_{a}$9	$_{a}$24	80	10	3	10	.04	.29
G	Bromus tectorum (a)	-	-	2	-	-	-	1	-	.00	-
G	Carex spp.	$_{b}$29	$_{c}$55	$_{a}$4	$_{a}$2	15	27	4	1	.02	.03
G	Oryzopsis hymenoides	-	-	1	-	-	-	1	-	.00	-
G	Poa bulbosa	-	-	4	-	-	-	1	-	.15	-
G	Poa fendleriana	-	-	4	8	-	-	3	3	.04	.06
G	Poa pratensis	-	-	-	2	-	-	-	1	-	.03
G	Poa secunda	$_{a}$263	$_{b}$304	$_{c}$339	$_{bc}$318	93	97	100	97	15.75	14.18
G	Sitanion hystrix	$_{c}$91	$_{b}$69	$_{a}$30	$_{a}$34	45	31	15	17	.25	.50
G	Stipa comata	-	-	-	2	-	-	-	1	-	.03
Total for Annual Grasses		0	0	2	0	0	0	1	0	0.00	0
Total for Perennial Grasses		600	547	405	474	233	214	132	170	16.32	15.75
Total for Grasses		600	547	407	474	233	214	133	170	16.33	15.75
F	Agoseris glauca	4	-	-	4	2	-	-	2	-	.03
F	Antennaria rosea	-	8	4	2	-	4	2	1	.06	.03
F	Arabis spp.	$_{a}$2	$_{b}$13	$_{ab}$3	$_{ab}$6	1	6	1	3	.00	.02
F	Astragalus convallarius	2	2	3	4	2	1	1	2	.03	.01
F	Calochortus nuttallii	3	4	-	3	1	2	-	1	-	.00
F	Collinsia parviflora (a)	-	-	-	1	-	-	-	1	-	.00
F	Cordylanthus ramosus (a)	-	-	$_{a}$8	$_{b}$23	-	-	4	14	.04	.14
F	Cryptantha spp.	$_{b}$13	$_{a}$-	$_{a}$-	$_{a}$-	8	-	-	-	-	-
F	Descurainia pinnata (a)	-	-	5	10	-	-	3	4	.01	.02
F	Erigeron divergens	14	14	19	18	6	6	8	8	.28	.14
F	Erigeron pumilus	$_{b}$12	$_{a}$-	$_{ab}$3	$_{ab}$8	5	-	1	4	.03	.02
F	Lomatium triternatum	-	9	-	-	-	4	-	-	-	-
F	Lomatium triternatum	-	-	-	5	-	-	-	3	-	.18
F	Microsteris gracilis (a)	-	-	-	16	-	-	-	7	-	.03
F	Penstemon humilis	5	1	1	-	2	1	1	-	.00	-
F	Phlox hoodii	$_{a}$5	$_{a}$7	$_{b}$53	$_{b}$60	2	3	24	23	1.12	1.24
F	Phlox longifolia	$_{a}$57	$_{c}$160	$_{b}$113	$_{ab}$89	30	59	46	40	.55	.40
F	Salsola iberica (a)	-	-	-	3	-	-	-	1	-	.00
F	Schoencrambe linifolia	-	-	-	1	-	-	-	1	-	.00
F	Trifolium spp.	$_{b}$25	$_{b}$12	$_{a}$-	$_{b}$24	16	7	-	12	-	.08

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'84	'90	'96	'01	'84	'90	'96	'01	'96	'01
F	Zigadenus paniculatus	$_{a}$-	$_{b}$11	$_{a}$2	$_{a}$1	-	6	1	1	.03	.03
Total for Annual Forbs		0	0	13	53	0	0	7	27	0.06	0.21
Total for Perennial Forbs		142	241	201	225	75	99	85	101	2.11	2.21
Total for Forbs		142	241	214	278	75	99	92	128	2.17	2.43

Values with different subscript letters are significantly different at alpha = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 02 , Study no: 35

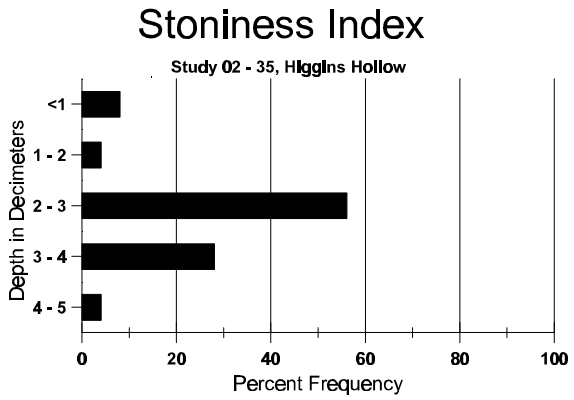
Type	Species	Strip Frequency		Average Cover %	
		'96	'01	'96	'01
B	Artemisia tridentata wyomingensis	96	97	20.53	26.73
B	Chrysothamnus viscidiflorus stenophyllus	39	46	1.36	1.90
B	Eriogonum microthecum	8	4	.01	.00
B	Opuntia spp.	3	6	.00	-
B	Tetradymia canescens	3	7	-	.06
Total for Browse		149	160	21.92	28.70

BASIC COVER --
Herd unit 02 , Study no: 35

Cover Type	Nested Frequency		Average Cover %			
	'96	'01	'84	'90	'96	'01
Vegetation	351	347	7.75	7.75	39.28	49.63
Rock	24	3	0	0	.10	.09
Pavement	44	76	.75	.25	.36	.46
Litter	394	387	76.00	54.25	38.15	44.29
Cryptogams	188	229	2.75	14.25	10.31	13.38
Bare Ground	275	248	12.75	23.50	23.33	17.78

SOIL ANALYSIS DATA --
Herd Unit 02, Study no: 35, Higgins Hollow

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
12.9	59.0 (13.1)	7.1	42.9	31.1	26.0	1.9	11.8	137.6	.6



PELLET GROUP FREQUENCY --
Herd unit 02 , Study no: 35

Type	Quadrat Frequency '96	Quadrat Frequency '01
Rabbit	12	14
Deer	13	11
Cattle	9	2

Pellet Transect	
Pellet Groups per Acre ⁄01	Days Use per Acre (ha) ⁄01
261	N/A
87	7 (17)
139	12 (29)

BROWSE CHARACTERISTICS --
Herd unit 02 , Study no: 35

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	84	64	-	-	-	-	-	-	-	-	64	-	-	-	4266			64
	90	21	-	-	-	-	-	-	-	-	21	-	-	-	1400			21
	96	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	84	24	-	-	-	-	-	-	-	-	24	-	-	-	1600			24
	90	31	3	-	-	-	-	-	-	-	33	-	-	1	2266			34
	96	59	6	-	-	-	-	-	-	-	65	-	-	-	1300			65
	01	8	-	-	-	-	-	-	-	-	7	1	-	-	160			8
M	84	6	20	9	-	-	-	-	-	-	35	-	-	-	2333	17	21	35
	90	4	18	-	-	-	-	-	-	-	21	1	-	-	1466	23	21	22
	96	101	101	7	-	-	-	-	-	-	209	-	-	-	4180	24	33	209
	01	176	28	-	-	-	-	-	-	-	194	10	-	-	4080	23	30	204
D	84	10	25	8	1	-	-	-	-	-	41	-	1	2	2933			44
	90	19	14	10	3	-	-	-	-	-	39	-	-	7	3066			46
	96	14	38	6	5	1	-	-	-	-	56	-	-	8	1280			64
	01	123	63	5	1	-	-	-	-	-	186	-	-	6	3840			192
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	1500			75
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	1260			63

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	44%	17%	03%	- 1%
'90	34%	10%	08%	- 1%
'96	43%	04%	02%	+16%
'01	23%	01%	01%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'84	6866	Dec:	43%
	'90	6798		45%
	'96	6760		19%
	'01	8080		48%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus stenophyllus																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	84	13	-	-	-	-	-	-	-	-	13	-	-	-	866			13
	90	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	84	55	-	-	-	-	-	-	-	-	55	-	-	-	3666	9	13	55
	90	-	-	-	4	-	-	-	-	-	4	-	-	-	266	8	12	4
	96	78	-	-	-	-	-	-	-	-	74	-	4	-	1560	10	17	78
	01	102	-	-	1	-	-	-	-	-	100	4	-	-	2080	10	17	104
D	84	15	-	-	-	-	-	-	-	-	15	-	-	-	1000			15
	90	65	3	-	-	-	-	-	-	-	29	-	38	1	4533			68
	96	3	-	-	-	-	-	-	-	-	-	-	1	2	60			3
	01	10	-	-	2	-	-	-	-	-	6	-	-	6	240			12

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	-10%
'90	04%	00%	52%	-68%
'96	00%	00%	09%	+30%
'01	00%	00%	05%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	5532	Dec:		18%
'90	4999			91%
'96	1620			4%
'01	2320			10%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Eriogonum microthecum																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	96	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	84	4	-	-	-	-	-	-	-	-	4	-	-	-	266	4	4	4
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	7	-	-	2	-	-	-	-	-	9	-	-	-	180	7	8	9
	01	4	-	-	-	-	-	-	-	-	4	-	-	-	80	6	9	4
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	-50%
'90	00%	00%	00%	+40%
'96	00%	00%	09%	-64%
'01	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	266	Dec:		0%
'90	133			0%
'96	220			9%
'01	80			0%

Opuntia spp.																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	84	6	-	-	-	-	-	-	-	-	6	-	-	-	400	5	7	6
	90	3	-	-	-	-	-	-	-	-	3	-	-	-	200	5	1	3
	96	5	-	-	-	-	-	-	-	-	5	-	-	-	100	4	11	5
	01	7	-	-	-	-	-	1	-	-	6	2	-	-	160	3	8	8
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	-50%
'90	00%	00%	00%	-50%
'96	00%	00%	00%	+44%
'01	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	400	Dec:		0%
'90	200			0%
'96	100			0%
'01	180			11%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Tetradymia canescens																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	84	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	90	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	84	-	4	-	-	-	-	-	-	-	4	-	-	-	266	5	4	4
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	2	-	-	-	-	-	-	-	-	2	-	-	-	40	5	10	2
	01	5	1	-	-	-	-	-	-	-	6	-	-	-	120	7	12	6
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	3	-	-	-	-	-	-	-	-	-	3	200			3
	96	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	01	-	2	-	-	-	-	-	-	-	-	-	-	2	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	80%	00%	00%	-20%
'90	00%	75%	75%	-77%
'96	00%	00%	33%	+67%
'01	33%	00%	22%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'84	332	Dec:	0%
	'90	266		75%
	'96	60		33%
	'01	180		22%